Electrically Driven Dreadnaught New Mexico Pride of Navy

Derives its Power from Nine Boilers, "Coals" Through a Hose, Makes Smoke Screens at Simple Turn of the Wrist

The battleship New Mexico is the pride of the United States Navy, and electric drive is the pride of the New Mexico. How the electrical machinery looks, how it works, why the electric drive is preferable to other forms of propulsion, how she looks inside and outside, is here related by one of the men who was recently a passenger on Uncle sam's latest superdreadnaught, riding between the Brooklyn Navy Yard and Rockland, Main.

This latest leviathan weighs 32,000 tons and repuires 32,000 horsepower or one horsepower per ton. Her weight is equivalent to a bar of iron weighing one pound to the foot and forming a band of iron from the North to the South Pole with enough in addition to reach from Maine almost to the borders of Florida. She is so huge that it requires ten tugs to push her from her pier in Brooklyn Navy Yard out into the East River. From the platform called the "crow's nest" at the top of the mast down to the level of the water is 120 feet, or equal in height to a ten-story building.

The battleship can generate enough electricity to run the giant General Electric Works and the Schenectady Railway Company.

Motors Drive Propellers

Like everything else that is electrical, the New Mexico is the cleanest institution of her kind. There are no engines or turbines connected with the propeller shafts—only electric motors. There are no grates under the boilers—merely oil burners. There is not a coal or ash shovel on the ship; nor are there any cinders, smoke, dust, or soot.

The New Mexico "coals" thru a 6 in. hose, that is because she burns only oil for her power. The total oil capacity of the dozen or more comparts is 3,400 tons or 6,800,000 lbs., or nearly a million gallons. If the New Mexico were an automobile with a mileage of 20 miles per gallon, this amount of oil would drive her close to 20 million miles or a distance equal to 80 times to the moon. But a 32,000-ton batleship does not equal the mileage of a flivver, for it weighs as much as 60,000 of those vehicles, and must plow thru the water displacing her own weight of water each time she runs her own length, 624 feet. The cost of fuel is more important on ship board than on land, and this is emphasized by the fact that on the 2,000-mile trial trip alone she will displace over 620,000,000 tons of water.

From Oil to Electricity

Following the energy of the oil fuel thru the different processes until this energy drives the propellers electrically is an entertaining and instructive trip. Escorted by courteous officers, you start for one of the three boiler rooms. You must open and close several steel bulkheads in the water-tight compartment and descend steel ladders and steel steps apparently equivalent to those in a five-story building. On the way down you must pass thru an "air lock" similar to those which give the excavators access to the caissons used in building the foundations of the skyscrapers 90 feet under Broadway, or in constructing the piers under big bridges in the middle of the river. The officer who escorts you is very careful to close the steel door behind you before he opens the one in front of you.

High Air Pressure

No sooner are the bolts loosened than you feel the increased air pressure swish into your ears. This is because the air in the fire-room is maintained at a higher pressure than the outside air. All the air which the firemen breathe is pumped air. There is more oxygen in a cubic foot of this air than there is in ordinary air. This increased pressure and increased oxygen are both useful in providing the proper combustion in the boiler.

How Smoke Screens Are Made

If the New Mexico wishes to throw a smoke screen, the men in the fire-room merely turn a few tiny hand valves in a ¼-in. pipe and, presto! inky blackness will vomit from the single smoke stack and blacken vast sea areas. This is a very nice study of how different mechanical mixtures of oil and air will bring about different chemical combinations between oil and oxygen. One of these combinations eliminates smoke by effecting almost perfect combustion; while the other creates a heavy black smoke which will practically blindfold the enemy. And three little ¼-in. pipes in each boiler are all that is needed to do this.

Size of Boilers

It is said that no other 32,000-ton battleship has as few as nine boilers. There are three boiler-rooms, each a separate compartment, and each room contains three large boilers. Each of these nine boilers can deliver over 4,000 horsepower and contains three miles of 2-in. seamless pipes. Put end to end the pipes in all nine boilers would make a seamless tube 27 miles long. The Pennyslvania has 12 boilers and the Oklahoma has 12, altho its tonnage is only 27,500.

The history of the steam engine shows that its inventor, James Watt, thruout his entire life opposed any steam pressure higher than 5 to 10 lbs. per square inch. The New Mexico's boilers supply steam at 250 lbs. per square inch!

Superheated Steam

After the steam is generated, and has past thru the big pipe away from the water in the boiler, it is again brought in contact with the flames of the furnace and is superheated to a still higher temperature. In fact as the staem leaves the boiler it is about 450 deg. F., or hot enough to melt solder and tin.

Superheated steam gives super-results. This is because the steam turbine is clast among engineers as a "heat engine" and the more heat that is supplied in this steam the more energy is available for power.

Two Power Plants

For propulsion there are two electric power plants in separate compartments. They are away down low in the New Mexico close to the boilers. Each of these power plants alone is able to drive the batleship at a speed of 18 knots. (A nautical mile, or knot, is 6,080 feet, as against 5,280 feet in a land mile.)

Turbine Electric Plant

In two separate steel compartments 15 by 45 ft. are located the two turbine generator sets, each not over 27 ft. long. The turbine itself is little larger than a hogshead of molasses laid over on its side. It seems incredible that this small machine can generate 16,000 horsepower from steam.

The engine rooms of most ships of the past have been a tangle of bending and curving pipes, and in order to move about the men had to stoop down to go under them or climb over them or squeeze between them. When one of these pipes burst it practically meant the death of every man in the engine room. One of the advantages of thes power plant rooms in the New Mexico is the fact that there is only one steam pipe in the room, and that is only 16 ft. long.

Steam Turbine

In each of these two power plants the steam turbines make electricity for driving the battleship. From the outside the most interesting thing about these wonderful rotary steam engines, called turbines, is their small size, their light weight, and the fact that they are so perfectly enclosed that you cannot see anything move. A turbine of 16,000 horsepower when compared in size and weight with a great triple and quadruple expansion steam engine that had been used up until recent years, is practically a watch charm—a little toy. There is only rotary motion in the steam turbine.

Inside the casing are ten wheels arranged sid by side like the coins are kept in a bank. In the rims of all of these wheels are hundreds of buckets against which the steam strikes. The steam enters at one end of the turbine and dashes against the buckets of each of these wheels, one after the other; and as it strikes against these buckets the wheels and the shaft to which they are fixt all turn around. This shaft drives the electric generator immediately adjacent, and in it the mechanical power is turned into electricity. Then eight copper wires only slightly larger than a garden hose convey the 16,000 horsepower thru the steel walls to the next compartment where the switchboard is located. Electric fans in the power plant ventilate the room and also cool the generator, and the heated air, is pumped outside.

The SwitchBoards.

When the eight electric wires leave the power plant room, they go to the electric switcres back of the switchboard. Here the ship is controlled upon receipt of instructions from the captain, sent either by loud speaking telephones, by indicators, by lights, or by messenger. Following these instructions, the engineers standing at the switchboard can start the vessel forward, or start it backwards; they can make it go many different speeds in either direction; they can run all four of the motors from one of the power plants, or from the other power plant; they can even split up the load so that one power plant wil run two of the motors forward and the other power plant will run the other two "astern." Another combination they can effect is that both power plants can equally share the load of driving the four motors—one to each propeller.

If one of the propellers becomes foul the engineer can disconnect this motor from the circuit, and then all of the power in the two power plants is available for the three remaining motors.

Giant Motor for Each Screw

Can you imagine a motor twice as high as a six-foot man? Can you imagine one motor capable of doing the work of 30,000 horses working at three eight-hour shifts? If so, then you can apreciate the picture which these made in their steel compartments. One of these giant motors is provided for each of the four propeller shafts. The screw is at one end of the shaft in the water, and the motor is at the other end of the shaft inside the ship. One reason for their efficiency is the fact that the shaft can be short as the motor can be close to the propeller. There is an additional advantage also, because the turbine, generators can be located near the boilers, and this permits of a short steam pipe. These very desirable features area result of electric drive, because it doesn't make any difference what is located between the power plant and the motors.

No Reversing Turbines

With electric drive, no reversing turbines are necessary, the reversing is done electrically. So with the electric drive, the turbine in the power plant always runs in the same direction and at highest efficiency.

Electrical propulsion not only does away with reversing turbines, but also does away with reversing gears. The wonderful simplicity of the arrangement can be apreciated also when you remember that the battleship Pennyslvania has ten turbines and the New Mexico only two.

Propeller More Efficient

Electric propulsion has another advantage in making the propeller more efficient. This is because, within limits, the faster a propeller turns, the less efficient it becomes. If it turns too rapidly, it merely churns the water, and therefore does not effectively drive the ship ahead. When turbines are directly connected to the propeller shaft, the turbine rotates too slowly, to be at the best efficiency and the propeller shaft rotates too rapidly to operate at its maximum efficiency. So you can look at electric propulsion as a means of speed reduction; for it Electric--Gal Three permits the turbines to rotate at their normally high speed, where they show the best fuel economy, and also permits the propeller to operate at comparatively low speed, where it gives the best driving economy. Without electric propulsion, there were at many different speeds practically "compromise" arrangements by which either the turbine was rotating too slowly or the propeller too fast. This is obviated in the New Mexico, which is one reason why, with one filling of her oil tanks, she can cruise over 50 per cent. further than with any othre equipment. In fact she can go 7,500 knots at 12 knots speed before it will be necessary to take on any more fuel.

Nearly 100,000 Horse Power

The New Mexico is practically the only 100 per cent. electric boat. This will be seen by glancing over, or, better yet, carefully reading the following table, showing her electrical equipment.

Particular attention is called to the loud speaking telephones, 104 in number, located all over the ship. From three different transmitting stations the bugle calls or other instructions can be sent to all or any one of the five different groups of these telephones.

Electrical Equipment

2 main generators	33,000 h.p.
4 motors for propelling	33,000 h.p.
6 dynamos	3,000 h.p.
6 air compressors	400 h.p.
2 vacuum pumps	80 h.p.
20 motors generator sets totaling almost	100 h.p.
4 boat crane motors	220 h.p.
2 anchor motors	250 h.p.
4 winch motors totaling	200 h.p.
20 turret motors	1,300 h.p.
10 ammunition hoists	500 h.p.
2 refrigerator motors	40 h.p.
8 motors in kitchen (Peel potatoes, mix dough and cake, and wash dishes, cut butter, make ice cream, meat grinder, all bread and cakes baked electrically.)	15 h.p.
6 in carpenter shop	20 h.p.
10 in machine shop	30 h.p.
6 in laundry (5 machines use electric heat)	10 h.p.
5 motors in print shop totaling	6 h.p.
14 pumps water	140 h.p.
4 oil pumps	8 h.p.
50 electric heaters	30 h.p.
12 searchlights	300 h.p.
160 fans, 60 blowers, 6 electric toasters, 1 electric percolator, 15 electric irons, 104 loud speaking telephones, 176 ship service telephones, 170 fire control telephones, 2 Sperry electric syroscopic compasses 7 portable electric drills 2 electric glue pots, 6 soldering irons.	

Does She Ever See the Pictures?

"Why the clean collar in such a hurry?"

"Gotta see my girl for a minute or two."

"But your shoes need polishing."

"She can't see my shoes."

"Huh?"

"She lives in one of these little booths in front of a picture theatre. We talk through the window."—Louisville Courier-Journal.

It Certainly Would

"Pop!"

"Yes, my son."

"Who was Pocahontas?"

"She was an Indian Princess of Virginia, who saved John Smith's life."

"Well, Pop, it would be some contract if she was called upon to do that same act for all the John Smiths today, now, wouldn't it?"—Yonkers Statesman.

Quite Right

Rushee—Where are the Fraternity men's quarters?

Sambo—Ah, don't think dey has any, suh; I'se been head two weeks, shinin' dey're shoes an' pressin' dey're clothes and all I'se evah seen is two nickels.—Nebraska Awgwan.

SUMMONS

IN THE SUPERIOR COURT OF MOHAVE COUNTY, STATE OF ARIZONA.

GRACE F. JONES, Plaintiff.

vs.

THOMAS L. JONES, Defendant.

In the Name of the State of Arizona to THOMAS L. JONES, Defendant, Greeting:

You Are Hereby Summoned and required to appear in an action brought against you by the above named plaintiff in the Superior Court of Mohave County, State of Arizona, and answer the Complaint therein filed with the Clerk of this said Court, at Kingman in said County, within twenty days after the service upon you of this Summons, if served in this said County, or in all other cases within thirty days thereafter, the times above mentioned being exclusive of the day of service, or judgment by default will be taken against you.

Given under my hand and seal of the Superior Court of Mohave County, State of Arizona, this first day of July, 1919.

(Seal) J. T. MORGAN, Clerk of said Superior Court.

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Last insertion August 2.

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PROGRAM FOR WEEK ENDING JULY 25TH

SATURDAY, JULY 19—. TOM MOORE in "THIRTY A WEEK" Also Mutt and Jeff Cartoon. REGULAR PRICES
A chauffer at thirty dollars a week has the gaul to fall in love with one of the rich men's daughter and he sure gets away with the prize in this delightful and compelling picture. You can't beat the luck of the Irish. Also a Mutt & Jeff Cartoon.

SUNDAY, JULY 20—. VIRGINIA PEARSON in "THE LOVE AUCTION" Also Christie Comedy. REGULAR PRICES
An exciting story of a woman who marries a man of wealth for to gain possession of luxuries and who finds her husband a brutal drunkard, who strikes her down at a fashionable reception and in a terrible fight strangles another man You will stand on your toes. Christie Comedy.

MONDAY, JULY 21—. Artcraft Special "Don't Change Your Husband" Also Sunshine Comedy "O WHAT A KNIGHT" Prices 17 and 39c.
This is easily the best picture of the season and created a sensation wherever shown. It is one of those pictures you will talk about long afterward. Directed by Cecile B. De Mille. A great domestic drama, which can easily be guaranteed as a good show. Also a Sunshine slapstick.

TUESDAY, JULY 22—. MAY ALLISON in "HER INSPIRATION" Also Strand Comedy. REGULAR PRICES
A good clean comedy drama of the Kentucky Hills. It is a bewildering and fascinating contradiction. It is a play of distinct and overwhelming surprises, going as it does from one extreme to another. Its heart appeal is at par with its surprises. Also a Strand comedy.

WEDNESDAY, JULY 23—. JOHN BARRYMORE in "Here Comes The Bride" Also "LURE OF THE CIRCUS" REGULAR PRICES
By all means see this comedy. Barrymore marries a veiled woman for $100,000 and when he sees her, he feels like dropping dead, but he needs the money, and you will get many a laugh out of this play watching the star in his awful perdicament. Some good show. Also the Circus.

THURSDAY, JULY 24—. WM. S. HART in "BREED OF MEN" Also Sunshine Comedy. PRICES, 17 and 39c
This story starts as follows: "Into the town of Chloride, Ariz., there rides one day 'Carless' Carmody, a boss cowpuncher." Now we didn't know that the producers ever knew there was such a town, but evidently they did. A thrilling and exciting picture. Also a Sunshine slapstick, "Merry Jailbirds."

FRIDAY, JULY 25—. BRYANT WASHBURN in "The Venus of the East" also Lyon and Moran Comedy. REGULAR PRICES
This is a famous Saturday Evening Post story by Wallace Irwin. Scenes are in a western mining camp, en route to New York City. He thought the Girl a thief, and technically she was; but her motive was right and she proved her true worth in the crisis. She was the guiding star. Also a comedy.

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